



# R Markdown Reference Guide

Learn more about R Markdown at [rmarkdown.rstudio.com](http://rmarkdown.rstudio.com)  
Learn more about Interactive Docs at [shiny.rstudio.com/articles](http://shiny.rstudio.com/articles)

Contents:

- 1. **Markdown Syntax**
- 2. Knitr chunk options
- 3. Pandoc options

| Syntax  | Becomes  |               |            |        |        |        |   |              |               |            |        |        |        |
|---|--|---------------|------------|--------|--------|--------|---|--------------|---------------|------------|--------|--------|--------|
| Plain text  | Plain text   |               |            |        |        |        |   |              |               |            |        |        |        |
| End a line with two spaces to start a new paragraph.  | End a line with two spaces to start a new paragraph.   |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>*italics*</code> and <code>_italics_</code>   | <i>italics</i> and <i>italics</i>  |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>**bold**</code> and <code>__bold__</code>   | <b>bold</b> and <b>bold</b>  |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>superscript^2^</code>   | superscript <sup>2</sup>   |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>~~strikethrough~~</code>  | <del>strikethrough</del>   |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>[link](www.rstudio.com)</code>  | <a href="http://www.rstudio.com">link</a>  |               |            |        |        |        |   |              |               |            |        |        |        |
| <code># Header 1</code>   | Header 1   |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>## Header 2</code>  | Header 2   |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>### Header 3</code>   | Header 3   |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>#### Header 4</code>  | Header 4   |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>##### Header 5</code>   | Header 5   |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>##### Header 6</code>   | Header 6   |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>endash: --</code>   | endash: –  |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>emdash: ---</code>  | emdash: —  |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>ellipsis: ...</code>  | ellipsis: ...  |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>inline equation: \$A = \pi * r^{2}\$</code>   | inline equation: $A = \pi * r^2$   |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>image: </code>   | image:                |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>horizontal rule (or slide break):</code>  | horizontal rule (or slide break):  |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>***</code>  |  |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>&gt; block quote</code>   | <div>block quote</div>   |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>* unordered list</code>   | <ul style="list-style-type: none"><li>unordered list</li></ul>   |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>* item 2</code>   | <ul style="list-style-type: none"><li>item 2</li></ul>   |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>+ sub-item 1</code>   | <ul style="list-style-type: none"><li><ul style="list-style-type: none"><li>sub-item 1</li></ul></li></ul> |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>+ sub-item 2</code>   | <ul style="list-style-type: none"><li><ul style="list-style-type: none"><li>sub-item 2</li></ul></li></ul> |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>1. ordered list</code>  | <ol style="list-style-type: none"><li>ordered list</li></ol>   |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>2. item 2</code>  | <ol style="list-style-type: none"><li>item 2</li></ol>   |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>+ sub-item 1</code>   | <ol style="list-style-type: none"><li><ul style="list-style-type: none"><li>sub-item 1</li></ul></li></ol> |               |            |        |        |        |   |              |               |            |        |        |        |
| <code>+ sub-item 2</code>   | <ol style="list-style-type: none"><li><ul style="list-style-type: none"><li>sub-item 2</li></ul></li></ol> |               |            |        |        |        |   |              |               |            |        |        |        |
| <table><tr><th>Table Header</th><th>Second Header</th></tr><tr><td>Table Cell</td><td>Cell 2</td></tr><tr><td>Cell 3</td><td>Cell 4</td></tr></table> | Table Header   | Second Header | Table Cell | Cell 2 | Cell 3 | Cell 4 | <table><tr><th>Table Header</th><th>Second Header</th></tr><tr><td>Table Cell</td><td>Cell 2</td></tr><tr><td>Cell 3</td><td>Cell 4</td></tr></table> | Table Header | Second Header | Table Cell | Cell 2 | Cell 3 | Cell 4 |
| Table Header  | Second Header  |               |            |        |        |        |   |              |               |            |        |        |        |
| Table Cell  | Cell 2   |               |            |        |        |        |   |              |               |            |        |        |        |
| Cell 3  | Cell 4   |               |            |        |        |        |   |              |               |            |        |        |        |
| Table Header  | Second Header  |               |            |        |        |        |   |              |               |            |        |        |        |
| Table Cell  | Cell 2   |               |            |        |        |        |   |              |               |            |        |        |        |
| Cell 3  | Cell 4   |               |            |        |        |        |   |              |               |            |        |        |        |



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| Syntax   | Becomes   |
|--|---|
| <p>Make a code chunk with three back ticks followed by an <code>r</code> in braces. End the chunk with three back ticks:</p> <pre>```\${r} paste("Hello", "World!") ```</pre>                        | <p>Make a code chunk with three back ticks followed by an <code>r</code> in braces. End the chunk with three back ticks:</p> <pre>paste("Hello", "World!")  ## [1] "Hello World!"</pre> |
| <p>Place code inline with a single back ticks. The first back tick must be followed by an <code>R</code>, like this <code>`r paste("Hello", "World!")`</code>.</p>                                   | <p>Place code inline with a single back ticks. The first back tick must be followed by an <code>R</code>, like this <code>Hello World!</code>.</p>                                      |
| <p>Add chunk options within braces. For example, <code>`echo=FALSE`</code> will prevent source code from being displayed:</p> <pre>```\${r eval=TRUE, echo=FALSE} paste("Hello", "World!") ```</pre> | <p>Add chunk options within braces. For example, <code>echo=FALSE</code> will prevent source code from being displayed:</p> <pre>## [1] "Hello World!"</pre>                            |

Learn more about chunk options at <http://yihui.name/knitr/options>

| Chunk options   |               |   |
|-----------------|---------------|---|
| option          | default value | description   |
| Code evaluation |               |   |
| child           | NULL          | A character vector of filenames. Knitr will knit the files and place them into the main document.   |
| code            | NULL          | Set to R code. Knitr will replace the code in the chunk with the code in the code option.   |
| engine          | 'R'           | Knitr will evaluate the chunk in the named language, e.g. <code>engine = 'python'</code> . Run <code>names(knitr::knit_engines\$get())</code> to see supported languages.   |
| eval            | TRUE          | If <code>FALSE</code> , knitr will not run the code in the code chunk.  |
| include         | TRUE          | If <code>FALSE</code> , knitr will run the chunk but not include the chunk in the final document.   |
| purl            | TRUE          | If <code>FALSE</code> , knitr will not include the chunk when running <code>purl()</code> to extract the source code.   |
| Results         |               |   |
| collapse        | FALSE         | If <code>TRUE</code> , knitr will collapse all the source and output blocks created by the chunk into a single block.   |
| echo            | TRUE          | If <code>FALSE</code> , knitr will not display the code in the code chunk above it's results in the final document.   |
| results         | 'markup'      | If <code>'hide'</code> , knitr will not display the code's results in the final document. If <code>'hold'</code> , knitr will delay displaying all output pieces until the end of the chunk. If <code>'asis'</code> , knitr will pass through results without reformatting them (useful if results return raw HTML, etc.) |
| error           | TRUE          | If <code>FALSE</code> , knitr will not display any error messages generated by the code.  |
| message         | TRUE          | If <code>FALSE</code> , knitr will not display any messages generated by the code.  |
| warning         | TRUE          | If <code>FALSE</code> , knitr will not display any warning messages generated by the code.  |
| Code Decoration |               |   |
| comment         | '###'         | A character string. Knitr will append the string to the start of each line of results in the final document.  |
| highlight       | TRUE          | If <code>TRUE</code> , knitr will highlight the source code in the final output.  |
| prompt          | FALSE         | If <code>TRUE</code> , knitr will add <code>&gt;</code> to the start of each line of code displayed in the final document.  |
| strip.white     | TRUE          | If <code>TRUE</code> , knitr will remove white spaces that appear at the beginning or end of a code chunk.  |
| tidy            | FALSE         | If <code>TRUE</code> , knitr will tidy code chunks for display with the <code>tidy_source()</code> function in the <code>formatR</code> package.  |





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| Chunk options (Continued)   |                 |  |
|-----------------------------|-----------------|--|
| option                      | default value   | description  |
| Chunks                      |                 |  |
| opts.label                  | NULL            | The label of options set in <code>knitr::opts_template()</code> to use with the chunk.   |
| R.options                   | NULL            | Local R options to use with the chunk. Options are set with <code>options()</code> at start of chunk. Defaults are restored at end.  |
| ref.label                   | NULL            | A character vector of labels of the chunks from which the code of the current chunk is inherited.  |
| Cache                       |                 |  |
| autodep                     | FALSE           | If <b>TRUE</b> , knitr will attempt to figure out dependencies between chunks automatically by analyzing object names.   |
| cache                       | FALSE           | If <b>TRUE</b> , knitr will cache the results to reuse in future knits. Knitr will reuse the results until the code chunk is altered.  |
| cache.comments              | NULL            | If <b>FALSE</b> , knitr will not rerun the chunk if only a code comment has changed.   |
| cache.lazy                  | TRUE            | If <b>TRUE</b> , knitr will use <code>lazyload()</code> to load objects in chunk. If <b>FALSE</b> , knitr will use <code>load()</code> to load objects in chunk.   |
| cache.path                  | 'cache/'        | A file path to the directory to store cached results in. Path should begin in the directory that the .Rmd file is saved in.  |
| cache.vars                  | NULL            | A character vector of object names to cache if you do not wish to cache each object in the chunk.  |
| dependson                   | NULL            | A character vector of chunk labels to specify which other chunks a chunk depends on. Knitr will update a cached chunk if its dependencies change.  |
| Animation                   |                 |  |
| anipots                     | 'controls,loop' | Extra options for animations (see the <code>animate</code> package).   |
| interval                    | 1               | The number of seconds to pause between animation frames.   |
| Plots                       |                 |  |
| dev                         | 'png'           | The R function name that will be used as a graphical device to record plots, e.g. <code>dev='CairoPDF'</code> .  |
| dev.args                    | NULL            | Arguments to be passed to the device, e.g. <code>dev.args=list(bg='yellow', pointsize=10)</code> .   |
| dpi                         | 72              | A number for knitr to use as the dots per inch (dpi) in graphics (when applicable).  |
| external                    | TRUE            | If <b>TRUE</b> , knitr will externalize tikz graphics to save LaTeX compilation time (only for the <code>tikzDevice::tikz()</code> device).  |
| fig.align                   | 'default'       | How to align graphics in the final document. One of 'left', 'right', or 'center'.  |
| fig.cap                     | NULL            | A character string to be used as a figure caption in LaTeX.  |
| fig.env                     | 'figure'        | The Latex environment for figures.   |
| fig.ext                     | NULL            | The file extension for figure output, e.g. <code>fig.ext='png'</code> .  |
| fig.height, fig.width       | 7               | The width and height to use in R for plots created by the chunk (in inches).   |
| fig.keep                    | 'high'          | If <b>'high'</b> , knitr will merge low-level changes into high level plots. If <b>'all'</b> , knitr will keep all plots (low-level changes may produce new plots). If <b>'first'</b> , knitr will keep the first plot only. If <b>'last'</b> , knitr will keep the last plot only. If <b>'none'</b> , knitr will discard all plots. |
| fig.lp                      | 'fig:'          | A prefix to be used for figure labels in latex.  |
| fig.path                    | 'figure/'       | A file path to the directory where knitr should store the graphics files created by the chunk.   |
| fig.pos                     | "               | A character string to be used as the figure position arrangement in LaTeX.   |
| fig.process                 | NULL            | A function to post-process a figure file. Should take a filename and return a filename of a new figure source.   |
| fig.retina                  | 1               | Dpi multiplier for displaying HTML output on retina screens.   |
| fig.scap                    | NULL            | A character string to be used as a short figure caption.   |
| fig.subcap                  | NULL            | A character string to be used as captions in sub-figures in LaTeX.   |
| fig.show                    | 'asis'          | If <b>'hide'</b> , knitr will generate the plots created in the chunk, but not include them in the final document. If <b>'hold'</b> , knitr will delay displaying the plots created by the chunk until the end of the chunk. If <b>'animate'</b> , knitr will combine all of the plots created by the chunk into an animation.       |
| fig.showtext                | NULL            | If <b>TRUE</b> , knitr will call <code>showtext::showtext.begin()</code> before drawing plots.   |
| out.extra                   | NULL            | A character string of extra options for figures to be passed to LaTeX or HTML.   |
| out.height, out.width       | NULL            | The width and height to scale plots to in the final output. Can be in units recognized by output, e.g. <code>8\\linewidth, 50px</code>   |
| resize.height, resize.width | NULL            | The width and height to resize tike graphics in LaTeX, passed to <code>\resizebox{ }{ }</code> .   |
| sanitize                    | FALSE           | If <b>TRUE</b> , knitr will sanitize tike graphics for LaTeX.  |



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| Templates             | Basic YAML          | Template options  | Latex options        | Interactive Docs    |
|-----------------------|---------------------|-------------------|----------------------|---------------------|
| html_document         | ---                 | ---               | ---                  | ---                 |
| pdf_document          | title: "A Web Doc"  | title: "Chapters" | title: "My PDF"      | title: "Slides"     |
| word_document         | author: "John Doe"  | output:           | output: pdf_document | output:             |
| md_document           | date: "May 1, 2015" | html_document:    | fontsize: 11pt       | slidy_presentation: |
| ioslides_presentation | output: md_document | toc: true         | geometry: margin=1in | incremental: true   |
| slidy_presentation    | ---                 | toc_depth: 2      | ---                  | runtime: shiny      |
| beamer_presentation   | ---                 | ---               | ---                  | ---                 |

## Syntax for slide formats (ioslides, slidy, beamer)

```
# Dividing slides 1

Pandoc will start a new slide at each first level header

## Header 2

... as well as each second level header

***

You can start a new slide with a horizontal rule`***` if you do not want
a header.

## Bullets

Render bullets with

- a dash
- another dash

## Incremental bullets

>- Use this format
>- to have bullets appear
>- one at a time (incrementally)
```

becomes



## Slide display modes

Press a key below during presentation to enter display mode. Press **esc** to exit display mode.

### ioslides

- f**
- enable fullscreen mode
- w**
- toggle widescreen mode
- o**
- enable overview mode
- h**
- enable code highlight mode
- p**
- show presenter notes

### slidy

- C**
- show table of contents
- F**
- toggle display of the footer
- A**
- toggle display of current vs all slides
- S**
- make fonts smaller
- B**
- make fonts bigger

## Top level options to customize LaTeX (pdf) output

| option                                 | description   |
|--|---|
| lang                                   | Document language code  |
| fontsize                               | Font size (e.g. 10pt, 11pt, 12 pt)  |
| documentclass                          | Latex document class (e.g. article)   |
| classoption                            | Option for document class (e.g. oneside); may be repeated                                 |
| geometry                               | Options for geometry class (e.g. margin=1in); may be repeated                             |
| mainfont, sansfont, monofont, mathfont | Document fonts (works only with xelatex and lualatex, see the latex_engine option)        |
| linkcolor, urlcolor, citecolor         | Color for internal, external, and citation links (red, green, magenta, cyan, blue, black) |





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| option         | html | pdf | word | md | ioslides | slidy | beamer | description   |
|----------------|------|-----|------|----|----------|-------|--------|---|
| colortheme     |      |     |      |    |          |       | X      | Beamer color theme to use (e.g., <code>colortheme: "dolphin"</code> ).  |
| css            | X    |     |      |    | X        | X     |        | Filepath to CSS style to use to style document (e.g., <code>css: styles.css</code> ).   |
| duration       |      |     |      |    |          | X     |        | Add a countdown timer (in minutes) to footer of slides (e.g., <code>duration: 45</code> ).  |
| fig_caption    | X    | X   | X    |    | X        | X     | X      | Should figures be rendered with captions?   |
| fig_crop       |      | X   |      |    |          |       | X      | Should pdfcrop utility be automatically applied to figures (when available)?  |
| fig_height     | X    | X   | X    | X  | X        | X     | X      | Default figure height (in inches) for document.   |
| fig_retina     | X    |     |      | X  | X        | X     |        | Scaling to perform for retina displays (e.g., <code>fig_retina: 2</code> ).   |
| fig_width      | X    | X   | X    | X  | X        | X     | X      | Default figure width (in inches) for document.  |
| font_adjustmen |      |     |      |    |          | X     |        | Increase or decrease font size for entire presentation (e.g., <code>font_adjustment: -1</code> ).   |
| fonttheme      |      |     |      |    |          |       | X      | Beamer font theme to use (e.g., <code>fonttheme: "structurebold"</code> ).  |
| footer         |      |     |      |    |          | X     |        | Text to add to footer of each slide (e.g., <code>footer: "Copyright (c) 2014 RStudio"</code> ).   |
| highlight      | X    | X   |      |    |          | X     | X      | Syntax highlighting style (e.g. "tango", "pygments", "kate", "zenburn", and   |
| includes       | X    | X   |      | X  | X        | X     | X      | See below   |
| -in_header     | X    | X   |      |    | X        | X     | X      | File of content to place in document header (e.g., <code>in_header: header.html</code> ).   |
| -before_body   | X    | X   |      |    | X        | X     | X      | File of content to place before document body (e.g., <code>before_body:</code>  |
| -after_body    | X    | X   |      |    | X        | X     | X      | File of content to place after document body (e.g., <code>after_body: doc_suffix.html</code> ).   |
| incremental    |      |     |      |    | X        | X     | X      | Should bullets appear one at a time (on presenter mouse clicks)?  |
| keep_md        | X    |     |      |    | X        | X     |        | Save a copy of .md file that contains knitr output (in addition to the .Rmd and HTML files)?  |
| keep_tex       |      | X   |      |    |          |       | X      | Save a copy of .tex file that contains knitr output (in addition to the .Rmd and PDF files)?  |
| latex_engine   |      | X   |      |    |          |       |        | Engine to render latex. Should be one of "pdflatex", "xelatex", and "lua <sup>1</sup> latex".   |
| lib_dir        | X    |     |      |    | X        | X     |        | Directory of dependency files to use (Bootstrap, MathJax, etc.) (e.g., <code>lib_dir: libs</code> ).  |
| logo           |      |     |      |    | X        |       |        | File path to a logo (at least 128 x 128) to add to presentation (e.g., <code>logo: logo.png</code> ).   |
| mathjax        | X    |     |      |    | X        | X     |        | Set to <code>local</code> or a URL to use a local/URL version of MathJax to render equations  |
| number_section | X    | X   |      |    |          |       |        | Add section numbering to headers (e.g., <code>number_sections: true</code> ).   |
| pandoc_args    | X    | X   | X    | X  | X        | X     | X      | Arguments to pass to Pandoc (e.g., <code>pandoc_args: ["--title-prefix", "Foo"]</code> ).   |
| preserve_yaml  |      |     |      | X  |          |       |        | Preserve YAML front matter in final document?   |
| reference_docx |      |     | X    |    |          |       |        | A .docx file whose styles should be copied to use (e.g., <code>reference_docx:</code>   |
| self_contained | X    |     |      |    | X        | X     |        | Embed dependencies into the doc? Set to <code>false</code> to keep dependencies in external files.  |
| slide_level    |      |     |      |    |          |       | X      | The lowest heading level that defines individual slides (e.g., <code>slide_level: 2</code> ).   |
| smaller        |      |     |      |    | X        |       |        | Use the smaller font size in the presentation?  |
| smart          | X    |     |      |    | X        | X     |        | Convert straight quotes to curly, dashes to em-dashes, ... to ellipses, and so on?  |
| template       | X    | X   |      |    |          | X     | X      | Pandoc template to use when rendering file (e.g., <code>template:</code>  |
| theme          | X    |     |      |    |          |       | X      | Bootswatch or Beamer theme to use for page. Valid bootswatch themes include "cerulean", "journal", "flatly", "readable", "spacelab", "united", and "cosmo". |
| toc            | X    | X   |      | X  |          |       | X      | Add a table of contents at start of document? (e.g., <code>toc: true</code> ).  |
| toc_depth      | X    | X   |      | X  |          |       |        | The lowest level of headings to add to table of contents (e.g., <code>toc_depth: 2</code> ).  |
| transition     |      |     |      |    | X        |       |        | Speed of slide transitions should be "slower", "faster" or a number in seconds.   |
| variant        |      |     |      | X  |          |       |        | The flavor of markdown to use; one of "markdown", "markdown_strict", "markdown_github", "markdown_mmd", and "markdown_phpextra"                             |
| widescreen     |      |     |      |    | X        |       |        | Display presentation in widescreen format?  |